PATENT SPECIFICATION (11) 1 318 462

DRAWINGS ATTACHED

1 318 462

(21) Application No. 39878/70 (22) Filed 19 Aug. 1970
(31) Convention Application Nos.
G 69 33 320.6 (32) Filed 23 Aug. 1969
G 69 41 724.9 27 Oct. 1969 in
(33) Germany (DT)
(44) Complete Specification published 31 May 1973
(51) International Classification B65D 47/18
(52) Index at acceptance
B8T 8G1 9X

(19)

(54) A DROP DISPENSER FOR BOTTLES OR THE LIKE CONTAINERS

(71) We, WIMMER K.G., of Bischofstrasse, 519 Stolberg, Germany; a German company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a drop dispenser for bottles or the like containers.

Pipettes are normally used for the dispensing drops of pharmaceutical or other fluids, e.g. eye, ear, or nose drops, reagents. The pipettes are usually connected to a screw plug cap of the bottle which contains the fluid and the dispensing of drops of the fluid thereby necessitates a certain amount of skill and is relatively involved.

More recently, drop dispensers have been developed which remain firmly connected to the bottle during its use. These drop dispensers consist of a bulky dispensing part which is fixed directly to the opening of the bottle, or to a main chamber in a longish nozzle which is connected to the bottle. By squeezing the main chamber, which replaces the rubber ball of the pipette, the fluid is intended to be dispensed in drops.

Experience has shown that it is difficult for fluid to be dispensed in single drops with tops of this kind and the fluid squirted out indiscriminately so that an orderly dosage is not possible or is possible only in rare cases.

It is an object of the invention to provide a drop dispenser which satisfactorily dispenses a dosage of drops independent of the pressure applied to the main chamber.

According to the present invention a dispenser for dispensing drop form doses for use with bottles or the like containers comprising a resilient portion which forms a main chamber, deformable under pressure and which is connectable to an openine in the container, a nozzle being connected to the main chamber via a duct of small diameter, the nozzle having a cylindrical bore of substantially larger diameter than that of the duct, characterized in that, when the dispenser is applied to the container, the interior of the main chamber is directly connected to the interior of the container, the bore in the nozzle extending to the free end of the nozzle and being provided with at least two axially spaced baffles dividing it into sections which form expansion chambers.

The nozzle may be a glass or plastics material part which is tightly connected to the resilient portion or main chamber or be advantageously connected as one piece to the main chamber.

The operation chamber consists of a thin-walled elastomer which is deformable under pressure. The outer configuration of the nozzle is not part of the subject-matter of the invention but it may be of cylindrical or conical shape.

With particularly weakly viscous fluids it is expedient for the nozzle bore to have at least two annular baffles which are arranged with axial spacing one from another.

In a further embodiment the baffles extend towards the centre of the tube from alternate sides thereof, the free front edge of which project at least as far as the axial central plane of the nozzle.

The invention will be described further, by way of example, with reference to the accompanying drawings, in which:—

Fig. 1 is a schematic longitudinal section (not to scale) through a drop-dispenser; and

Fig. 2 is a schematic longitudinal section (not to scale) through an alternative embodiment.

The drop dispenser shown in Fig. 1 consists of a single-piece hollow body formed of rubber, plastics or the like material, and has a resilient portion forming a main chamber 1 which is slightly conical and which is provided with a flange at one end. The

dispenser can be connected by means of a screw-ring (not shown) to the neck of a bottle which is likewise not shown.

A cylindrical nozzle 2 extends from the other end of portion 1 and is integrally formed with the portion 1 and connected thereto by a duct 3, whose diameter is several times smaller than the internal diameter of the resilient portion 1.

The nozzle 2 has a cylindrical longitudinal bore 4 having a diameter about three times larger than that of the duct 3. This longitudinal bore 4 is divided by two annular baffles 5 and 6 which are arranged in axial spacing from each other and which project inwardly into the bore 4 and form two expansion chambers 7 and 8 and also a discharge outlet 9. The internal diameter of the baffles 5 and 6 is about one and a half times as large as the diameter of the duct 3.

In the alternative embodiment shown in Fig. 2, the nozzle 2 has a cylindrical passage 10 of a diameter about three times that of the duct 3. This passage 10 is divided by at least two baffles 11 which are arranged in axial spacing from each other, and oppositely extending in inward direction into the passage 10 and to form expansion chambers 13, as well as a discharge outlet chamber 14. The front edges 12 of the baffles 11 advantageously extend at least as far as the central axial plane of the nozzle 2, so that in the top plan view the space 10 appears to be closed.

In operation of the dispenser of Fig. 1, a bottle provided with the drop dispenser located over its opening is held with the bottle opening directed downwards, so that the operation chamber is filled with fluid. The portion 1, formed of flexible material which is deformable under pressure, is then pressed together by hand, whereby fluid under relatively high pressure and speed, is admitted via the duct 3 into the expansion chamber 7, where, because of the larger diameter of the chamber 7 relative to the duct 3 the rate of flow is reduced. A further part of the volume of fluid is admitted through the cross-section outlet of the baffle 5 into the next expansion chamber 8, and there undergoes a further reduction of the rate of flow. From the discharge outlet there then emerges, because of the regulation achieved in the expansion chamber 7 and 8, merely a drop of fluid, independent of the force with which the main chamber is pressed together. In the case of liquids of particularly low viscosity, a third expansion chamber may be necessary to achieve this effect.

In operation of the embodiment according to Fig. 2, a bottle provided with a drop dispenser over its outlet opening is held with its opening directed downwardly so that the operation chamber of the dispenser is filled with fluid. The portion 1, which consists of flexible material deformable under pressure, is then pressed together with a force such that fluid under relatively high pressure and with high speed is thereby admitted through the duct 3 into the first expansion chamber 13 where because of the larger diameter of the chamber 13 relative to the duct 3 the rate of flow is reduced. Part of the fluid then flows round the first baffle 11 into the next expansion chamber 10, and undergoes a further braking of the rate of flow.

As the fluid, which is pressed into the nozzle portion, finds no direct passage to the discharge outlet, but is turned several times around the baffles 11, squirting-out of the fluid in the form of a jet is completely avoided. Experiments have shown that only a single drop emerges from the nozzle and in each case not directly dependent on the degree of pressure exerted on the portion 1.

The present invention is not intended to be limited to the embodiments illustrated. Thus, it is also possible to design the nozzle as a part which is separate from the main chamber. Furthermore, it is also possible to provide only a single expansion chamber when the use of relatively high viscous fluids is envisaged. Also, the outer shaping of operating chamber and nozzle can deviate from the exemplified embodiments.

Experiments have also shown that the fluids remaining in the nozzle can be satisfactorily sucked back upon releasing the pressure on the main chamber.

The drop dispenser is particularly suitable for the application of ear or eye drops, where administration of an exact dosage is of importance.

The term "small diameter" as used herein means of such a size that without pressure upon the main chamber no liquid would pass through the duct.

WHAT WE CLAIM IS:—

1. A dispenser for dispensing drop form doses for use with bottles or the like containers comprising a resilient portion which forms a main chamber, deformable under pressure and which is connectable to an opening in the container, a nozzle being connected to the main chamber via a duct of small diameter, the nozzle having a cylindrical bore of substantially larger diameter than that of the duct, characterized in that, when the dispenser is applied to the container, the interior of the main chamber is directly connected to the interior of the container, the bore in the nozzle extending to the free end of the nozzle and being provided with at least two axially spaced baffles dividing it into sections which form expansion chambers.

2. A dispenser as claimed in claim 1, in

which the baffles are annular.

3. A dispenser as claimed in claim 1 or 2, in which the baffles extend towards the centre of the bore from alternate sides thereof, the free front edges of which project at least as far as the axial central plane of the nozzle.

4. A dispenser as claimed in claim 1, 2 or 3, in which the nozzle is formed integrally with the main chamber.

5. A drop dispenser constructed and arranged to operate substantially as herein described with reference to and as illustrated in Fig. 1 of the accompanying drawings.

6. A drop dispenser constructed and arranged to operate substantially as herein described with reference to and as illustrated in Fig. 2 of the accompanying drawings.

POTTS, KERR & CO.

Printed for Her Majesty's Stationery Office by The Tweeddale Press Ltd., Berwick-upon-Tweed, 1973.
Published at the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

1318462 COMPLETE SPECIFICATION
2 SHEETS This drawing is a reproduction of the Original on a reduced scale
Sheet 1

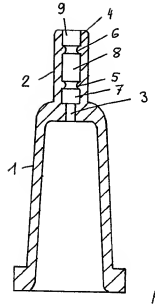

Fig.1

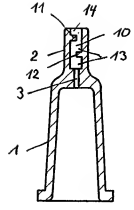

Fig. 2